1890MNRAS..50..467M

Ref. No.	Apparent Duration of Radiant.	Place of Radiant. α	δ	Approximate Star.
		°	°	
37	March–September	272	+ 21½	102 Herculis.
38	February–August	281	− 13	λ Aquilæ.
39	April–August	296	± 0	η Aquilæ.
40	April–September	302	+ 23½	17 Vulpeculæ.
41	March–October	313	+ 77	κ Cephei.
42	May 13–August 13	314	+ 15	γ Delphini.
43	March–September	315	+ 49	α Cygni.
44	July–Sept., Nov. and Jan.	334	+ 58	δ Cephei.
45	June–December	346	± 0	β Piscium.

Bristol: 1889 *October* 4.

Ephemeris for Physical Observations of the Moon. By A. Marth.

1890 July 1 to December 31.

Greenwich Noon.		Selenographical Colong. of the Sun.	Lat.	Geocentric Libration. Sel. Long. of the Earth.	Lat.	Combined Amount.	Direction.
1890.		°	°	°	°	°	°
July	1	78·85	+0·44	−4·13	+0·07	4·13	89·1
	2	91·04	·47	2·46	1·82	3·06	53·6
	3	103·23	·50	−0·60	3·46	3·51	9·8
	4	115·42	·53	+1·31	4·86	5·04	344·9
	5	127·62	·55	3·13	5·92	6·70	332·2
	6	139·82	+0·58	+4·72	+6·57	8·09	324·4
	7	152·03	·61	5·98	6·80	9·04	318·9
	8	164·24	·63	6·83	6·60	9·49	314·2
	9	176·46	·66	7·27	6·02	9·43	309·8
	10	188·68	·68	7·31	5·15	8·94	305·3
	11	200·91	·70	7·00	4·03	8·07	300·1
	12	213·15	·72	6·37	2·74	6·94	293·4
	13	225·39	+0·74	+5·50	+1·35	5·67	283·8
	14	237·64	·76	4·44	−0·08	4·45	269·0
	15	249·89	·78	3·25	1·49	3·58	245·4
	16	262·14	·80	1·96	2·82	3·44	214·9
	17	274·39	·82	+0·63	4·02	4·07	188·9
	18	286·64	·84	−0·72	5·04	5·09	171·9
	19	298·89	·86	2·05	5·85	6·19	160·7
	20	311·14	+0·88	−3·33	−6·40	7·22	152·6
	21	323·38	·90	4·52	6·68	8·07	146·1
	22	335·62	·92	5·58	6·67	8·69	140·3

1890MNRAS..50..467M

Greenwich Noon.	Selenographical		Geocentric Libration.			
	Colong. of the Sun.	Lat. of the Sun.	Sel. Long. of the Earth.	Lat. of the Earth.	Combined Amount.	Direction.
1890.	°	°	°	°	°	°
July 23	347·85	+0·95	−6·45	−6·36	9·05	134·7
24	0·08	·97	7·09	5·74	9·10	129·2
25	12·30	0·99	7·43	4·82	8·85	123·1
26	24·51	1·01	7·41	3·62	8·24	116·1
27	36·72	+1·04	−6·98	−2·18	7·32	107·4
28	48·92	1·06	6·12	−0·56	6·14	95·3
29	61·11	1·08	4·81	+1·13	4·95	76·8
30	73·30	1·11	3·12	2·79	4·19	48·2
31	85·49	1·13	−1·15	4·29	4·44	14·9
Aug. 1	97·67	1·15	+0·97	5·48	5·57	350·1
2	109·86	1·17	3·04	6·29	6·98	334·3
3	122·05	+1·19	+4·88	+6·64	8·24	323·8
4	134·24	1·21	6·36	6·56	9·13	314·0
5	146·44	1·22	7·38	6·06	9·54	309·6
6	158·65	1·24	7·89	5·24	9·46	303·7
7	170·86	1·25	7·93	4·15	8·94	297·7
8	183·08	1·27	7·54	2·89	8·07	291·0
9	195·30	1·28	6·80	1·52	6·97	282·6
10	207·53	+1·29	+5·80	+0·13	5·80	271·3
11	219·76	1·30	4·60	−1·28	4·78	254·5
12	232·00	1·31	3·30	2·60	4·19	231·7
13	244·24	1·32	1·94	3·80	4·26	207·0
14	256·48	1·33	+0·57	4·83	4·86	186·8
15	268·73	1·34	−0·75	5·65	5·70	172·4
16	280·97	1·36	2·02	6·23	6·54	162·1
17	293·21	+1·37	−3·20	−6·54	7·27	154·0
18	305·45	1·38	4·27	6·56	7·82	147·0
19	317·69	1·39	5·22	6·28	8·16	140·4
20	329·92	1·40	6·02	5·70	8·28	133·6
21	342·15	1·41	6·62	4·85	8·20	126·4
22	354·37	1·43	6·99	3·74	7·92	118·3
23	6·58	1·44	7·05	2·40	7·45	108·9
24	18·79	+1·45	−6·77	−0·90	6·83	97·6
25	30·99	1·46	6·08	+0·70	6·12	83·4
26	43·18	1·47	4·99	2·31	5·49	65·1
27	55·36	1·48	3·48	3·80	5·15	42·4
28	67·54	1·49	−1·64	5·06	5·32	17·9

1890MNRAS..50..467M

Greenwich Noon.	Selenographical		Geocentric Libration.			
	Colong. of the Sun.	Lat. of the Sun.	Sel. Long. of the Earth.	Lat. of the Earth.	Combined Amount.	Direction.
1890.	°	°	°	°	°	°
Aug. 29	79·72	+1·50	+0·40	+5·98	5·99	356·2
30	91·90	1·51	2·48	6·48	6·93	339·2
31	104·07	+1·52	+4·38	+6·52	7·85	326·2
Sept. 1	116·25	1·52	5·96	6·12	8·53	316·0
2	128·43	1·53	7·08	5·35	8·86	307·3
3	140·62	1·53	7·69	4·29	8·80	299·3
4	152·81	1·53	7·79	3·03	8·35	291·3
5	165·01	1·53	7·43	1·65	7·61	282·5
6	177·21	1·53	6·70	+0·23	6·70	272·0
7	189·42	+1·53	+5·67	−1·17	5·78	258·3
8	201·63	1·53	4·44	2·49	5·09	240·7
9	213·85	1·53	3·10	3·69	4·82	220·1
10	226·07	1·53	1·74	4·72	5·03	200·2
11	238·29	1·52	+0·40	5·55	5·56	184·1
12	250·52	1·52	−0·87	6·14	6·20	171·9
13	262·75	1·52	2·01	6·47	6·77	162·8
14	274·98	+1·52	−3·04	−6·51	7·18	155·1
15	287·21	1·52	3·93	6·25	7·38	147·9
16	299·44	1·52	4·68	5·69	7·36	140·7
17	311·67	1·52	5·28	4·87	7·18	132·8
18	323·89	1·52	5·71	3·76	6·83	123·4
19	336·10	1·52	5·97	2·45	6·45	112·4
20	348·31	1·51	5·97	−0·99	6·06	99·5
21	0·51	+1·51	−5·72	+0·55	5·83	84·5
22	12·71	1·51	5·16	2·10	5·57	67·8
23	24·90	1·51	4·26	3·56	5·55	50·0
24	37·06	1·51	3·02	4·83	5·69	32·0
25	49·25	1·50	−1·49	5·80	5·99	14·4
26	61·42	1·50	+0·24	6·39	6·40	357·8
27	73·58	1·49	2·04	6·55	6·86	342·8
28	85·74	+1·48	+3·73	+6·27	7·28	329·4
29	97·90	1·47	5·17	5·59	7·61	317·3
30	110·06	1·46	6·23	4·56	7·72	306·3
Oct. 1	122·22	1·45	6·84	3·30	7·59	295·8
2	134·39	1·44	6·97	1·89	7·22	285·2
3	146·56	1·42	6·67	+0·42	6·68	273·7
4	158·74	1·41	5·98	−1·02	6·06	260·3

1890MNRAS..50..467M

Greenwich Noon. 1890.	Selenographical Colong. of the Sun.	Selenographical Lat. of the Sun.	Geocentric Libration. Sel. Long. of the Earth.	Geocentric Libration. Lat. of the Earth.	Geocentric Libration. Combined Amount.	Direction.
	°	°	°	°	°	°
Oct. 5	170·93	+1·39	+4·99	−2·39	5·53	244·4
6	183·12	1·38	3·80	3·62	5·25	226·3
7	195·31	1·36	2·49	4·68	5·31	208·0
8	207·51	1·35	+1·15	5·54	5·66	191·7
9	219·71	1·34	−0·14	6·16	6·17	178·8
10	231·92	1·32	1·32	6·52	6·65	168·6
11	244·13	1·31	2·36	6·59	7·00	160·4
12	256·35	+1·29	+3·22	−6·37	7·13	153·3
13	268·56	1·28	3·89	5·83	7·00	146·4
14	280·78	1·27	4·37	4·99	6·63	138·9
15	292·99	1·25	4·67	3·90	6·08	129·9
16	305·20	1·24	4·79	2·58	5·44	118·3
17	317·41	1·23	4·74	−1·10	4·87	103·0
18	329·61	1·21	4·51	+0·46	4·54	84·1
19	341·81	+1·20	−4·09	+2·02	4·56	63·6
20	354·00	1·19	3·47	3·49	4·92	44·8
21	6·18	1·17	2·64	4·77	5·45	28·9
22	18·35	1·15	1·59	5·77	5·99	15·4
23	30·52	1·13	−0·38	6·42	6·45	3·4
24	42·68	1·12	+0·94	6·67	6·74	352·0
25	54·83	1·10	2·29	6·50	6·89	340·7
26	66·98	+1·07	+3·55	+5·92	6·89	329·2
27	79·13	1·05	4·61	4·97	6·77	317·3
28	91·27	1·03	5·38	3·74	6·55	304·9
29	103·42	1·00	5·80	2·32	6·25	291·9
30	115·57	0·98	5·85	+0·81	5·90	277·9
31	127·72	·95	5·52	−0·70	5·56	262·8
Nov. 1	139·87	·93	4·84	2·14	5·30	246·1
2	152·03	+0·90	+3·90	−3·45	5·20	228·4
3	164·19	·87	2·76	4·59	5·35	210·9
4	176·36	·85	1·49	5·51	5·71	195·1
5	188·54	·82	+0·19	6·19	6·19	181·7
6	200·72	·80	−1·08	6·61	6·70	170·7
7	212·90	·77	22	6·74	7·10	161·9
8	225·09	·75	3·19	6·58	7·31	154·2
9	237·29	+0·73	−3·95	−6·11	7·26	147·2
10	249·49	·71	4·45	5·33	6·94	140·2
11	261·69	·68	4·69	4·26	6·33	132·4

1890MNRAS..50..467M

Greenwich Noon.	Selenographical Colong. of the Sun.	Selenographical Lat. of the Sun.	Geocentric Libration. Sel. Long. of the Earth.	Geocentric Libration. Lat. of the Earth.	Geocentric Libration. Combined Amount.	Direction.
1890.	°	°	°	°	°	°
Nov. 12	273·89	+0·66	−4·67	−2·94	5·51	122·3
13	286·09	·64	4·40	−1·44	4·63	108·1
14	298·29	·62	3·93	+0·17	3·93	87·5
15	310·48	·60	3·27	1·80	3·73	61·2
16	322·67	+0·57	−2·47	+3·33	4·15	36·5
17	334·86	·55	1·55	4·68	4·92	18·2
18	347·04	·52	−0·56	5·74	5·77	5·5
19	359·21	·50	+0·48	6·46	6·48	355·8
20	11·37	·47	1·51	6·78	6·95	347·5
21	23·53	·44	2·51	6·69	7·14	339·6
22	35·68	·42	3·41	6·20	7·07	331·3
23	47·82	+0·39	+4·16	+5·35	6·78	322·3
24	59·96	·36	4·72	4·20	6·31	311·8
25	72·09	·32	5·05	2·83	5·78	299·3
26	84·22	·29	5·11	+1·33	5·28	284·6
27	96·36	·26	4·90	−0·21	4·91	267·5
28	108·49	·23	4·42	1·69	4·73	249·1
29	120·63	·20	3·68	3·10	4·81	229·8
30	132·77	+0·16	+2·72	−4·32	5·11	212·2
Dec. 1	144·91	·13	1·60	5·33	5·56	196·6
2	157·06	·10	+0·36	6·09	6·10	183·3
3	169·21	·07	−0·93	6·59	6·64	172·0
4	181·37	·04	2·19	6·81	7·15	162·3
5	193·54	+0·02	3·35	6·74	7·52	153·7
6	205·71	−0·01	4·34	6·36	7·70	145·8
7	217·88	−0·04	−5·09	−5·69	7·63	138·3
8	230·06	·07	5·55	4·72	7·28	130·5
9	242·25	·09	5·68	3·48	6·66	121·6
10	254·44	·12	5·45	2·02	5·82	110·4
11	266·63	·14	4·88	−0·41	4·89	94·8
12	278·82	·16	3·99	+1·27	4·18	72·4
13	291·01	·19	2·85	2·89	4·06	44·5
14	303·20	−0·21	−1·53	+4·35	4·62	19·8
15	315·39	·24	−0·14	5·53	5·53	1·4
16	327·57	·26	+1·23	6·35	6·47	349·0
17	339·74	·29	2·50	6·76	7·21	339·8
18	351·90	·32	3·59	6·75	7·65	332·1

1890MNRAS..50..467M

Greenwich Noon.	Selenographical Colong. of the Sun.	Lat. of the Sun.	Geocentric Libration. Sel. Long. of the Earth.	Lat. of the Earth.	Combined Amount.	Direction.
1890.	°	°	°	°	°	°
Dec. 19	4·06	−0·35	+4·45	+6·34	7·74	325·1
20	16·21	·38	5·07	5·57	7·52	317·8
21	28·36	−0·41	+5·43	+4·50	7·04	309·8
22	40·50	·44	5·54	3·20	6·39	300·1
23	52·63	·47	5·41	1·75	5·69	288·0
24	64·76	·50	5·07	+0·25	5·08	272·8
25	76·89	·53	4·53	−1·26	4·70	254·4
26	89·02	·56	3·80	2·67	4·64	234·8
27	101·15	·59	2·90	3·94	4·89	216·3
28	113·28	−0·62	+1·86	−5·01	5·35	200·3
29	125·41	·65	+0·70	5·85	5·89	186·8
30	137·54	·68	−0·55	6·42	6·45	175·2
31	149·68	−0·70	−1·83	−6·72	6·96	164·8

Errata in Vol. II. of Oppolzer's Lehrbuch zur Bahnbestimmung.

By Lieut.-General J. F. Tennant, R.E., F.R.S.

I have found the following errors in addition to the extended list issued subsequently to the publication of the work.

Page 11. Formula 16. For $C^{d-p}\{1, 2, 3 \ldots d-1\}$, read $C^{d-p}\{1^2, 2^2, 3^2 \ldots (d-1)^2\}$.

15. Line 7 from bottom. For $mf\{a+(i+\frac{1}{2})w\}$, read $mf^1\{a+(i+\frac{1}{2})w\}$.

32. Line 8 from bottom, in dl after $l(a+[i+n]w)$, for $+$ read $=$.

41. Formula 15. In the limits of integration, for $a+(i+\frac{1}{2}m)$, read $a+(i+\frac{1}{2})m$.

108. Line 2 from bottom. For $\frac{1}{24}f(a)+$, read $\frac{1}{24}f(a)-$.

148. Line 1. For $(\nu)^2$, read $(\,(\nu)\,)^2$.

150. Line 3 from bottom. For $\tau' t$, read τ'.

151. Line 7 from bottom. For $(12\gamma-a\alpha)$, read $(12\gamma+a\alpha)$.

163. Line in formula for β. For $\frac{\sin\frac{1}{2}(E-E_0)}{\frac{1}{2}(E-E_0)}$, read $\frac{\sin\frac{1}{2}(E-E_0)}{\frac{1}{2}(E-E_0)\sin 1''}$.

I may mention also that there seem to be errors in the figures of the computations from careless reading, thus:—

Page 110.	Log. $S_{(x)}$	for Oct. 27	should be 2_n·861612	instead of	1_n·861612.
	„ $S_{(z)}$	„ Dec. 6	„ 0_n·075547	„	0_n·045547.
111.	Log. fq	„ Feb. 24	„ 2·328069	„	2·308069.
	fqx	„ Dec. 6	„ 2_n·028385	„	2·128385.
	fqz	„ Oct. 27	„ 1·732151	„	1·733151.
	$\Delta\Sigma(z)$	„ Oct. 27	„ −0·62	„	−0·00

Erratum.

Vol. L., page 353, line 12 from bottom, *for* "*Berliner*" *read* "*Nautisches.*"